

IN THE CLAIMS

Please amend the claims as follows:

1.(Currently Amended) Apparatus for frequency Doppler correction in a wireless communications system, wherein signals transferred transmissions within the system to receiving user terminals experience a Doppler effect that varies over time in relation to a user terminal position, comprising:

a first frequency synthesizer for generating a carrier signal for the transfer of data that is oscillating at a rate responsive to a first input;

a counter coupled to said first input for generating a Doppler compensation signal having a predetermined rate of change as Doppler changes over time, said counter having a clock input; and

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a second frequency synthesizer coupled to said clock input for generating a clock signal oscillating at a rate responsive to a rate input; and

a rate input signal generator outputting a rate input signal coupled to said second frequency synthesizer rate input so as to adjust wherein said rate input adjusts over time so that said Doppler compensation signal is a time varying magnitude signal with a slope that varies at a changing rate over time according to a predetermined sequence so that said Doppler compensation signal as to compensates for said Doppler effect at varying rates as it changes over time.

2.(Original) The apparatus according to claim 1, wherein the wireless communications system comprises a satellite communications system including an earth-based gateway, a satellite, and a user terminal, and said frequency correction apparatus is located at said earth based gateway.

3.(Currently Amended) A system for frequency correcting transmissions between first and second transceivers in a wireless communications system to minimize Doppler frequency effects, comprising:

carrier generating means in the first transceiver for generating a carrier signal oscillating at a rate responsive to a first input;

Doppler compensation means coupled to said carrier generating means for generating a Doppler compensation signal; and

clock generating means coupled to a clock input of said Doppler compensation means for generating a clock signal oscillating at a rate responsive to a predetermined rate; and

rate input means coupled to said clock generating means and adjustable over time according to a predetermined sequence so as to adjust that said Doppler compensation signal to be a time varying magnitude signal with a slope that varies at a changing rate over time which compensates for said Doppler effect at varying rates as it changes over time.

4. (Original) The system according to claim 3, wherein the wireless communications system comprises a satellite communications system including an earth-based gateway incorporating the first transceiver, a satellite incorporating the second transceiver, and a user terminal.

5.(Currently Amended) A method for frequency correction of Doppler effects in a wireless communications system, comprising:

generating a carrier signal oscillating at a rate responsive to a first input;

generating a Doppler compensation signal having a predetermined rate of change as Doppler changes over time;

generating a clock signal oscillating at a rate responsive to a rate input; and

adjusting said rate input over time according to a predetermined sequence so that said Doppler compensation signal compensates for said Doppler effect.

a rate input signal generator outputting a rate input signal coupled to said second frequency synthesizer rate input so as to adjust wherein said rate input adjusts over time so that said Doppler compensation signal is a time varying magnitude signal with a slope that varies at a changing rate over time according to a predetermined sequence so that said Doppler compensation signal as to compensates for said Doppler effect at varying rates as it changes over time.

6.(New) The apparatus for frequency Doppler correction of Claim 1, wherein said counter is configured to have an increment value that is held substantially constant, and variations in the rate at which the counter increments in response to said second frequency synthesizer output varies the slope of said Doppler compensation signal.

7.(New) The apparatus for frequency Doppler correction of Claim 6, wherein increasing the rate of the clock incrementing increases the slope of said Doppler compensation signal.

8.(New) The apparatus for frequency Doppler correction of Claim 6, wherein decreasing the rate of the clock incrementing decreases the slope of said Doppler compensation signal.

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9.(New) The apparatus for frequency Doppler correction of Claim 1 wherein said counter generates an N-bit output Doppler compensation signal, said counter commencing counting with an initial value and counting at a rate determined by a clock signal; and a frequency of said clock signal being set by a rate input which varies over time for a given signal for which compensation is being implemented.

10.(New) The apparatus for Doppler correction of Claim 1 wherein said rate input is updated on an infrequent basis.

11.(New) The apparatus for Doppler correction of Claim 1 wherein said rate input is updated in an aperiodic manner, with faster updating during periods of faster change of Doppler compensation signal, and slower updating during periods of slow change.

12.(New) Apparatus for Doppler correction in a wireless communications system, wherein signals are generated as spread spectrum encoded communication signals and as transferred within at least a portion of the system experience a code or frequency Doppler effect that varies over time, comprising:

a first frequency synthesizer for generating a carrier signal for the transfer of data that is oscillating at a rate responsive to a first input;

a counter coupled to said first input for generating a Doppler compensation signal having a predetermined rate of change as it changes over time, said counter having a clock input; a second frequency synthesizer coupled to said clock input for generating a clock signal oscillating at a rate responsive to a rate input; and

a rate input signal generator outputting a rate input signal coupled to said second frequency synthesizer rate input so as to adjust said rate input over time so that said Doppler compensation signal is a time varying magnitude signal with a slope that varies at a changing rate over time so as to compensates for said Doppler effect at varying rates as it changes over time.

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13.(New) The apparatus for Doppler correction of Claim 12 wherein communication signals traverse between transmitting and receiving stations that are moving relative to each other resulting in said code Doppler.

14.(New) The apparatus for Doppler correction of Claim 12 wherein:

said counter generates an N-bit output Doppler compensation signal, said counter commencing counting with an initial value and counting at a rate determined by a clock signal; and

a frequency of said clock signal being set by a rate input which varies over time for a given signal for which compensation is being implemented.

15.(New) The apparatus for Doppler correction of Claim 2 wherein said signal is pre-corrected at a communication system gateway and post-corrected at a satellite.

16.(New) The apparatus for code Doppler correction of Claim 12 wherein the frequency with which rate input is updated is increased to increase the granularity of Doppler compensation signal and allow for a closer match to a representative ideal value.

17.(New) The apparatus for code Doppler correction of Claim 12 wherein the rate at which the clock increments is increased and a corresponding scaling factor applied to ensure a proper slope is maintained to provide for a more granular approximation.

18.(New) The apparatus for code Doppler correction of Claim 12 further comprising frequency and phase accumulators having bit width values based upon the frequency errors which are introduced by fixed-point effects.

19.(New) A method of correcting for time errors manifested in response to Doppler in a communication system, comprising:

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pre-correcting a forward-link signal such that the code timing of transmissions from a gateway by integrating the relative satellite to gateway velocity over time intervals; and

advancing or retarding the timing on signal processing elements, by a preselected fraction of the spreading code PN chip period whenever the relative satellite to gateway range increases or decreases by an amount equal to ssaid pre-selected fraction times the speed of light.

20.(New) A method for compensating for carrier frequency and code Doppler in a communication system employing CDMA spread spectrum modulated signals, comprising:

modulating a data signal using a coding clock signal so as to produce a coded data signal;

modulating said coded data signal by a pre-corrected carrier signal to form a pre-corrected transmission signal;

modulating said coded data signal by a second pre-correction modulation to independently generate a pre-corrected coding clock signal when the carrier frequency is not a multiple of the code rate.